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TI - VISUAL DEFECT INSPECTION DEVICE
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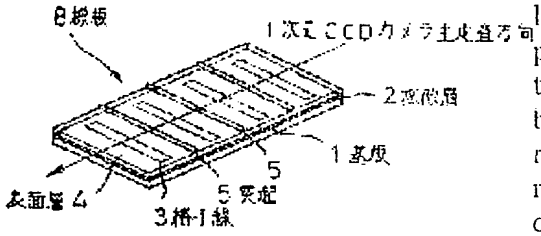
(54) **VISUAL DEFECT INSPECTION DEVICE**



(57)Abstract:
PROBLEM TO BE SOLVED: To detect a defect in a photoreceptor surface with high contrast.
SOLUTION: Two types of layers with optical specificity, or a surface layer 4 with a glossy surface and a diffusion layer 2, are laminated. The diffusion layer 2 has grid lines 3, and the surface layer 4 has projections 5 as pseudo defects. The use of the same target 8 determines a defective light reception state of both layers, and a correction of a camera light reception position depending on the deflective light reception state permits a camera to image and detect a defect in a photoreceptor surface with high contrast.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the appearance defective test equipment applied to the appearance defective inspection process of a laminating mold electrophotography photo conductor.
[0002]
[Description of the Prior Art] In a laminating mold electrophotography photo conductor, especially the photo conductor corresponding to digital image processing, if an appearance defect etc. arises, in a surface layer, the amount of lifting and diffuse reflection Mitsunari accompanied by [on the other hand] the selective absorption in a defect in an internal layer will generate the reflection which consists of a part for specular reflection Mitsunari resulting from a glossy surface, and a scattered-light component resulting from surface layer irregularity.
[0003] Generally, as a defective inspection method using an image pick-up camera, the diffuse reflection light-receiving method by the method lighting of slanting twisted in single lighting / image pick-up system was taken.
[0004]
[Problem(s) to be Solved by the Invention] However, the component which included the concavo-convex information in a surface layer 101, the internal layer 102, and the surface layer 101 of the photo conductor 100 which consists of the base 103 in said conventional method as shown in drawing 19 Since the concavo-convex 101a is the free sculptured surface of specular reflection nature, a three-dimension configuration is not fixed like drawing 19 (a) - (c). Since the directivity of the scattered light 105 according that whenever [incident angle / of the incident light 104 which constitutes the field with various inclinations and illuminates a

surface layer 101 in this case] is fixed to concavo-convex 101a changes with the inclinations of concavo-convex 101a, Although it separates in many cases from the light-receiving range of the image pick-up camera currently installed ahead of the surface layer 101 and concavo-convex 101a exists in the surface layer 101 in fact, that information does not go into an image pick-up signal generates the scattered light 105.
[0005] For this reason, although the directional sensitivity of a target which can incorporate the both sides of the reflective component of all the surface layers 101 and the reflective component of the internal layer 102 by the defect to an image pick-up camera at coincidence had to be given to optical system, it was very difficult to perform this conventionally by the single illumination system and image pick-up system of a fixed incident angle. moreover, when detecting each defect of a subject of examination with two different directional sensitivity of a target, the cure which uses together two lighting means or two image pick-up means as a theory takes -- having -- **** -- a single side -- with the chart of description, and a proofreading sheet, the property of evaluating a different defect whose two reflector exists in description was not acquired. and sufficient amendment was not able to be performed.
[0006] Moreover, if an illuminating angle is made small in the method lighting of slanting and parts for many specular reflection Mitsunari are incorporated in order to solve this problem, contrast will fall by part for specular reflection Mitsunari of high brightness, and the image pick-up of a defect will become difficult.
[0007] moreover, in the camera light-receiving location amendment using a master drum In the proofreading which the alignment to an image pick-up side becomes difficult, and carries out periodically since a defect exists in the specific location of master drum lifting An artificial mistake tends to be induced by the proofreading activity, there are not only problems, such as requiring skill, but it will be necessary to prepare a master drum two or more kinds for every object defect, and complicated and the problem that the storage and management are very complicated will occur in a proofreading activity.
[0008] Furthermore, when amending, since it needed to be set as the critical location which receives the two multiplied reflected lights with different directional sensitivity of a target by high contrast, conventionally, intuitive and empiricism-trial-and-error followed the camera light-receiving location on these setting, and effectiveness was very bad [the location].
[0009] The purpose of this invention has a defect on the front face of a photo conductor in offering the appearance defective test equipment it enabled it to detect by high contrast.
[0010]
[Means for Solving the Problem] In order to attain said purpose, the appearance defective test equipment of this invention In the appearance defective test equipment which irradiates light at a predetermined include angle from a lighting system at a laminating mold electrophotography photo conductor, picturizes this irradiated photo conductor side from a normal with an image pick-up camera, catches optical change of an image pick-up part, and detects defective irregularity It is characterized by forming an optical baffle plate into the optical path of said laminating mold electrophotography photo conductor with which it had the surface layer and the internal layer at least, and said lighting system.
[0011] Moreover, it is characterized by said optical baffle plate being a gobo.
[0012] Moreover, it is characterized by shading the bright line of the Rhine-like lighting object which is a lighting system 40 to 60% with said gobo
[0013] Moreover, said optical baffle plate is a diffusion plate, and it is characterized by the permeability being 50 - 75%.
[0014] Moreover, said optical baffle plate is characterized by being with the diffusion plate formed between the collimate lens system prepared in the optical outgoing radiation edge of a lighting system, and **** for camera light-receiving location amendment and said lighting system.

[0015] In the appearance defective test equipment of said configuration, when an optical baffle plate is a gobo by using an optical baffle plate Adjustment to the location in which the light guide bright line used as a part for the strongest specular reflection Mitsunari is hidden 40 to 60% is performed, and when it is a diffusion plate An incidence setup for partial specular reflection Mitsunari to which the remarkable thing of the light which carried out incidence is not scattered about, and go straight on, And randomize the incident angle of a partial light to a projection, and when an optical baffle plate is the combination of a collimate lens system and a diffusion plate By preparing the collimate lens system which raises rectilinear-propagation directivity in the outgoing radiation edge of a Rhine-like lighting system so that many things of the light which carried out incidence can go straight on, and randomizing the incident angle of a partial light to a projection The optimal incident light distribution for a concavo-convex image pick-up and a defective image pick-up is acquired, and it becomes possible to give **** and image pick-up capacity to be examined.
[0016]
[Embodiment of the invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing.
[0017] It is the perspective view of an example of **** which drawing 1 requires for this invention, and the sectional view of the important section of this example [drawing 2], and the gridline 3 to which the white diffusion layer (internal layer) 2 is established, and becomes the front face of this diffusion layer 2 from a black pattern at intervals of predetermined is formed on the substrate 1 of an aluminum plate.
[0018] Moreover, the white ground of a diffusion layer 2 constitutes the perfect diffuse surface by the titanium oxide filler, and the gridline 3 serves as lusterless black on appearance. In addition, a diffusion layer 2 may not be a white ground, or may be colored.
[0019] The surface layer 4 which has a translucency glossy surface is formed in the top face of a diffusion layer 2, and the projection 5 which is a false projection defect at intervals of predetermined is formed in the front face so that it may not lap with a gridline 3.
[0020] In addition, the width of face of projection 5 sets spacing of 200 micrometers and a gridline 3 to 10mm, and enables it to have identified the light-receiving signal. A gridline 3 may not be a rectangle-like and may not be black.
[0021] Here, each component of **** is explained.
[0022] The internal layer 2 of said diffusion layer has a large refractive index as titanium oxide including the titanium oxide particle which has optical diffusibility, and is physically [chemically or] stable, and its big thing of a whiteness degree is desirable. These all can be used although there are a rutile mold and an anatase in titanium oxide.
[0023] When it takes into consideration carrying out the laminating of the surface layer 4 which has translucency further on it as binder resin, the high resin of solvent resistance is desirable to a common organic solvent. Water soluble resin, alcoholic fusibility resin, and hardenability resin can be used.
[0024] While inspection light reflects on a charge transportation layer front face in the case of the photo conductor with which a sensitization layer carries out the laminating of the transparent charge transportation layer on a charge generating layer, a part of incident light enters into a layer, on the front face of a charge generating layer, it will reflect, and it will be refracted [it will be refracted, and], and will come out to the exterior. In the case of such lamination, the location range for distinguishing the irregularity of a charge transportation layer front face, respectively, and detecting it with an internal defect, will become narrow.
[0025] In order to decide the narrow location, it becomes possible by setting 20-degree contrast glossiness in the surface layer 4 of **** to 0.7-0.8.
[0026] 20-degree contrast glossiness expresses the ratios I0/I20 of the flux of light I0 in 0 degree of angle of reflection, and the flux of light I20 in a specular reflection location (20

degrees of angle of reflection), when it is made into 20 degrees of incident angles.
[0027] This value is controllable by the particle size and the content of a filler which are contained in the internal layer 2.
[0028] In this example, the oil free alkyd-resin BEKKO light M6401 (product made from Dainippon Ink Chemistry) and melamine resin super BEKKAMIN G-821 (product made from Dainippon Ink Chemistry) were used as binder resin, TA-300 (product made from Fuji Titanium) was used as titanium oxide, and the internal layer 2 with a thickness of 2 micrometers was formed on 400x200mm aluminum substrate.
[0029] Then, the gridline 3 was drawn on the front face of the internal layer 2, then the polycarbonate resin pan light C-1400 (Teijin formation Make) was used, and the surface layer 4 and projection 5 which have translucency with a thickness of 20 micrometers were formed. What is necessary is just to make about 10-30 micrometers of front faces of the internal layer 2 form this using the resin which has membrane formation nature as a surface layer 4, for example, polyester, a polycarbonate, polystyrene, etc.
[0030] Drawing 3 is the explanatory view showing the physical relationship of the optical lighting system in test equipment, and ****, and **** which explained 7 in the drum work-piece location at the time of inspection, and explained 8 by the shape of a sheet, tabular drawing 1 , and drawing 2 , the 1-dimensional CCD camera a Rhine-like lighting system and whose 10 are light-receiving equipment as for 9, and 11 are lamp houses.
[0031] Drawing 4 , drawing 5 , and drawing 6 are the mimetic diagrams showing the situation of reflection of light, in each of these drawings, in 12, incident light and 13 show a camera light-receiving optical axis, and 14-16 show each reflective component.
[0032] In **** 8, the light which the reflective component 14 by which it was multiplied (for scattered-light component + specular reflection Mitsunari) by the projection 5 of a surface layer 4 was generated (drawing 4), and passed the surface layer 4 further generates the diffusion selective reflection component 15 in alignment with a gridline 3 in a diffusion layer 2 first (drawing 5). That by which the component of these two light was multiplied serves as the reflective component 16 to the paint film exterior, and will go away to it (drawing 6), light will be received with said 1-dimensional CCD camera 10, and a signal will be sent out to a signal processing system.
[0033] Moreover, by the data point which receives the reflected light from **** 8 and is obtained, said signal processing system measures the characteristic quantity of projection 5 and a gridline 3, and consists of 1-dimensional CCD camera 10 and signal processor 17 for checking the validity of a camera location which it is and are illustrated to drawing 7 , and **** 8 for amendment illustrated to drawing 3 and the Rhine-like lighting system 9.
[0034] 1-dimensional CCD camera 10 which is light-receiving equipment receives a gridline 3 and the reflected light of projection 5 under suitable lighting, and outputs a light-receiving signal to a signal processor 17.
[0035] A signal processor 17 consists of an A/D (analog/digital signal) converter 18, CPU19, etc. With A/D converter 18, the analog signal inputted from 1-dimensional CCD camera 10 is changed into a digital signal, and by CPU19, signal processing, such as smoothing, derivation, and FFT, is performed to the inputted wave signal, a wave signal is quantified to it, and it outputs to it to the monitor section 20.
[0036] Drawing 9 is the signal wave form which picturized **** 8 and was acquired, 21 is the detection signal of projection 5 and 22 is the detection signal of a gridline 3. Coming, supposing it is not receiving the reflected light of projection 5 now, the light-receiving signal of **** 8 serves as a signal wave form as shown by 23 in drawing 10 .
[0037] Drawing 8 is the flow chart of signal processing, and in CPU19, after it performs RF noise processing (data smoothing) (S3) after A/D conversion (S2) to an input signal (S1), it performs the first degree time amount differential (S4). Although the wave by which

emphasis processing was differentiated and carried out may be simply compared with the threshold for a judgment within CPU19 after this, when the precision of amendment of the direction at the time of quantifying the appearance period of said detection signal 21 of projection 5 improves, it performs frequency analysis processings, such as a high-speed Fourier transformation or the maximum entropy method, (S5), and specifies the wave-like description with a frequency and a power spectrum (S6). Then, as compared with the control parameter for a judgment (S7), the result is displayed on the monitor section 20 by CPU19.
[0038] A camera light-receiving location is adjusted [whether the output wave is in agreement with a control parameter, and] according to a procedure like every day or every week like the above. Then, test equipment will be equipped with the laminating mold electrophotography photo conductor which is an inspected object instead of **** 8 if proofreading of an image pick-up system ends.
[0039] Since the camera light-receiving localization is performed by carrying out signal processing of the light-receiving signal from a surface layer 4 and the internal layer 2 using said **** 8 according to this example, problems, such as requiring complicatedness like before and skill, are not only solved, but it does so the effectiveness that working efficiency increases. Furthermore, an inspection worker looks into a camera finder visually, it amends or it becomes unnecessary to acquire an image pick-up image dynamically and to check a defective light-receiving condition.
[0040] As a fundamental configuration of the appearance defective test equipment concerning this invention, although already explained The Rhine-like lighting system 9 which irradiates light (only the optical axis of incident light 12 is shown) on the front face of the inspected object (laminating mold electrophotography photo conductor) M which consists of a surface layer 24, an internal layer 25, and the base 26 as shown in drawing 11 , It has 1-dimensional CCD camera (camera light-receiving optical axis 13) 10 which receives the reflected light from the optical exposure field of the front face of the inspected object M, the acquisition image from the optical exposure field received by this 1-dimensional CCD camera 10 is processed, and an appearance defect is detected. The optical system which can acquire the scattered light used as the partial specular reflection in a surface layer 24 is made to constitute from this test equipment which also treats the reflected light information by the transparent projection defect of said surface layer 24 as an image, and it is needed to make the image which the focus suited most to 1-dimensional CCD camera 10 form.
[0041] Below, it explains receiving the surface layer projection scattered light.
[0042] When the reflector and 1-dimensional CCD camera 10 which exist on the camera light-receiving optical axis 13 arranged like drawing 11 are considered, If it is the case of an ideal method lighting method of slanting and diffuse reflection light light-receiving method (only internal-defect reflected light light-receiving) without the need of photographing a part for the scattered light or specular reflection Mitsunari 31 (specular reflection light) Geometrically, 1-dimensional CCD camera 10 does not need to arrange the optical baffle plate which will be later mentioned that what is necessary is just to arrange in the form which intersects perpendicularly with the camera light-receiving optical axis 13 if there is especially no need. In drawing 11 , 30 is a part for diffuse reflection Mitsunari (diffuse reflection light).
[0043] The projection defect 32 of a surface layer 24 must be detected, and it will become impossible however, in the case of the inspected object M, for this reason, for the reflective component in a projection to incorporate by the camera side, but to picturize these projection defects 32 by the optical system as the theory of drawing 11 as shown in drawing 12 - drawing 14 .
[0044] Moreover, in order to solve this problem, it is possible but to arrange the Rhine-like lighting system 9 so that an illuminating angle may be make small in the method lighting of slanting and parts for many specular reflection Mitsunari 31 to the 1-dimensional CCD

camera 10 side may be incorporate, and when the amount of [of high brightness] specular reflection Mitsunari increases in this case, the contrast of the whole acquisition image falls (whitening of an image), and the image pick-up of a defect becomes difficult on the contrary (refer to drawing 17).

[0045] From the above view, various investigations about the inspection optical system used for the visual inspection of the surface layer 24 of the inspected object M and the internal layer 25 were conducted.

[0046] Consequently, it was checked that the defect of surface layer 24 and internal layer 25 both sides can picturize the following optical baffle plates which adjust the space intensity distribution of incident light by high contrast by having made it arrange between the inspected object M and the Rhine-like lighting system 9.

[0047] For example, when the location which includes the optical information on the projection defect 32 of a surface layer 24 most is made into the optimal optical system, it will call it the optical-system arrangement Fig. shown in drawing 12 - drawing 14 . In this case, the incident angle of the Rhine-like lighting system 9 is made small with theta=20deg. in order to incorporate parts for more specular reflection Mitsunari.

[0048] Next, the example of said optical baffle plate is explained.

[0049] When applying the surface-analysis technique by above-mentioned opto-electronics to defective inspection of the inspected object M, as it is shown in drawing 12 , the directional sensitivity of a target of a surface layer 24 and the internal layer 25 is used (drawing 15 , drawing 16), the light 12 of the Rhine-like lighting system 9 is irradiated at this inspected object M, and the equipment which receives the reflected light from this optical exposure field with 1-dimensional CCD camera 10 can be considered. In drawing 15 and drawing 16 , 29 is a scattered-light component (scattered light).

[0050] With this equipment, the strong photoluminescent reflected light reflected from the optical exposure field of a surface layer 24 enters in a camera visual field partially, and the projection defective image pick-up image of the surface layer 24 created with 1-dimensional CCD camera 10 turns into a scattered-light image of high brightness, and is caught.

[0051] In this case, in order to enable it to incorporate parts for many specular reflection Mitsunari of a surface layer 24, according to Fresnel's principle, whenever [incident angle / of a Rhine-like lighting system] is set up shallowly (=20deg.).

[0052] Moreover, the scattered light 29 by the projection defect 32 from the surface layer 24 of the inspected object M, 1-dimensional CCD camera 10 arranged in the location which incorporates a part for diffuse reflection Mitsunari 30 (refer to drawing 15 and drawing 16). from the internal layer 25 to coincidence, it has the gobo 27 (drawing 12) arranged in the Rhine-like lighting system 9 and the location which interrupts the reflective bright line of the Rhine-like lighting which is an optical baffle plate only 40 to 60%, the diffusion plate 28 (drawing 13) of 50 - 75% of permeability, or the collimate lens system 33+ diffusion plate 28 (drawing 14).

[0053] Since image pick-up optical system has incorporated much a part for specular reflection Mitsunari 31 in a surface layer 24 at this time, when said optical baffle plate cannot be found, it is buried by the amount of [which stored the defective information on the internal layer 25 / 30] diffuse reflection Mitsunari into those for specular reflection Mitsunari 31, and the SN ratio of an internal-defect signal falls (refer to drawing 17). However, it not only can incorporate now the reflected light of the projection defect 32 with all the inclinations, and an internal layer defect, but by arranging said optical baffle plate between the Rhine-like lighting system 9 and the inspected object M, the reflective signal ratio for a part for specular reflection Mitsunari 31 and diffuse reflection Mitsunari 30 becomes almost equal, and it can acquire a good image now (refer to drawing 18). If the lighting field of the inspected object M illuminated through said optical baffle plate is picturized with 1-dimensional CCD camera

10 at this time, the picture signal of the lighting field of an image pick-up side will be outputted. If the projection defect 32 is shown in a surface layer 24 in that case, diffused-light incidence will reflect according to the inclination of the projection defect 32, the scattered light 29 which goes to lens opening of 1-dimensional CCD camera 10 among those will be condensed, and image formation of the defective image will be carried out.

[0054] as shown in drawing 12 , when it has a gobo 27 as an optical baffle plate, this gobo 27 has the straight edge for the protection from light outside an image pick-up field, and light guide bright-line electric shielding, and a gobo 27 receives the bright line -- also falling -- it is set right. Fine tuning of an arrangement location is performed observing the analog output from 1-dimensional CCD camera 10 with an oscilloscope. If the power for specular reflection Mitsunari 31 in a surface layer 24 is controlled to 50% with a gobo 27, the reflective signal ratio for a part for specular reflection Mitsunari 31 and diffuse reflection Mitsunari 30 becomes almost equal, and a good image can be acquired (refer to drawing 18). As for the ratio which shades the light guide bright line used as a part for this strongest specular reflection Mitsunari, what satisfies 40 - 60% is desirable.

[0055] As shown in drawing 13 , when it has the diffusion plate 28 (this example bitter taste rewrite No. 422,432 (Mitsubishi Rayon Co., Ltd. make)) as an optical baffle plate, as for the permeability of the diffusion plate 28 which diffuses the light guide bright line used as a part for the strongest specular reflection Mitsunari etc., what satisfies 50 - 75% is desirable, and more than it or the following also affects the image pick-up capacity of a defect.

[0056] As shown in drawing 14 , when it has the collimate lens system 33+ diffusion plate 28, 60% or less is sufficient as the permeability of the diffusion plate 28 which diffuses the light guide bright line used as a part for the strongest specular reflection Mitsunari etc., and the thing for general lighting can be used for it (this example bitter taste rewrite No. 441,435 (Mitsubishi Rayon Co., Ltd. make)). This is raising the directivity for specular reflection Mitsunari for the place for which the high (50 - 75%) diffusion plate of permeability which goes straight on, without scattering about the remarkable things of the light which carried out incidence is needed by the collimate lens system 33 in order to usually receive a surface layer defect (a part for partial specular reflection Mitsunari), when inserting a diffusion plate in a lighting side. In this example, pair use of the cylindrical lens is carried out as a collimate lens.

[0057] By the way, although the point of strong photoluminescent white may be picturized in an acquisition image when 1-dimensional CCD camera 10 receives the scattered-light component 29 of the projection defect 32, the projection defect 32 is detectable by identifying this projection defective image reflected white by the image processing technique.

[0058] Since the amount of [of the internal layer 25 buried into those for specular reflection Mitsunari / 30] diffuse reflection Mitsunari can also be made to reach in a camera visual field originally by equipping with the optical baffle plate mentioned above compared with the case of not equipping The color nonuniformity of an internal diffusion layer, a minute defect, etc. become possible [detecting to coincidence], similarly, the image acquisition also of the internal layer defect is carried out as brightness change of many gradation, and a defect is extracted by the image processing.

[0059] However, since the scattered-light component 29 of the projection defect 32 will deviate from a camera visual field depending on the alignment condition of the optical system containing said optical baffle plate when extreme, cautions are required for the alignment using an oscilloscope.

[0060] The optical baffle plate which was used in the appearance defective test equipment mentioned above and which adjusts the space intensity distribution of incident light is used also in the case of the camera location amendment which used said **** 8, and is effective.

[0061] Although illustration is not carried out concretely, the inspected object M in drawing 12 - drawing 14 is replaced with **** 8 explained by drawing 1 and drawing 2 . Namely,

between this **** 8 and the Rhine-like lighting system 9 By installing the gobo 27 explained based on drawing 12 , the diffusion plate 28 explained based on drawing 13 , the diffusion plate 28 explained based on drawing 14 , or the collimate lens system 33 The gridline 3 of the diffusion layer 2 in **** 8 and the projection 5 of a surface layer 4 can be picturized by high contrast.

[0062] Therefore, by using said optical baffle plate for a camera location compensator, the projection 5 by the data point received and obtained with 1-dimensional CCD camera 10 and measurement of the characteristic quantity of a gridline 3 can perform the reflected light from **** 8 correctly and certainly, and the check of the validity of a camera location will be made more by accuracy.

[0063]

[Effect of the Invention] As explained above, according to invention according to claim 1, by using the optical baffle plate arranged between an inspection object and a lighting system, a floodlighting component is adjusted and the image pick-up of almost all the defects in a surface layer to be examined and an internal layer of the appearance defective test equipment of this invention is attained.

[0064] As said optical baffle plate, by using a gobo, a floodlighting component is adjusted and, according to invention according to claim 2, the image pick-up of almost all the defects in a surface layer to be examined and an internal layer is attained.

[0065] According to invention according to claim 3, by shading the bright line of Rhine-like lighting 40 to 60% with said gobo, a floodlighting component is adjusted and the image pick-up of almost all the defects in a surface layer to be examined and an internal layer is attained.

[0066] According to invention according to claim 4, by using the diffusion plate whose permeability is 50 - 75% as said optical baffle plate, a floodlighting component is adjusted and the image pick-up of almost all the defects in a surface layer to be examined and an internal layer is attained.

[0067] According to invention according to claim 5, by having equipped the outgoing radiation edge of a lighting system with the collimate lens system, and having arranged the diffusion plate between the subject of examination and the lighting system further as said optical baffle plate, a floodlighting component is adjusted and the image pick-up of almost all the defects in a surface layer to be examined and an internal layer is attained.

CLAIMS

[Claim(s)]

[Claim 1] Appearance defective test equipment characterized by to form an optical baffle plate in the appearance defective test equipment which irradiates light at a predetermined include angle from a lighting system at a laminating mold electrophotography photo conductor, picturizes this irradiated photo conductor side from a normal with an image pick-up camera, catches optical change of an image pick-up part, and detects defective irregularity into the optical path of said laminating mold electrophotography photo conductor with which it had the surface layer and the internal layer at least, and said lighting system.

[Claim 2] Appearance defective test equipment according to claim 1 characterized by said optical baffle plate being a gobo.

[Claim 3] Appearance defective test equipment according to claim 2 characterized by shading the bright line of the Rhine-like lighting object which is a lighting system 40 to 60% with said gobo.

[Claim 4] Appearance defective test equipment according to claim 1 characterized by for said optical baffle plate being a diffusion plate, and the permeability being 50 - 75%.

[Claim 5] Appearance defective test equipment according to claim 1 characterized by said optical baffle plate being with the diffusion plate formed between the collimate lens system prepared in the optical outgoing radiation edge of a lighting system, and **** for camera light-receiving location amendment and said lighting system.

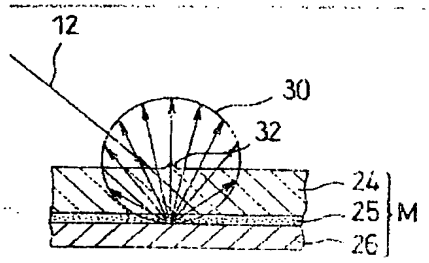


Fig 16

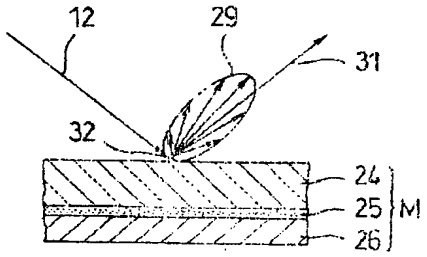


Fig 15

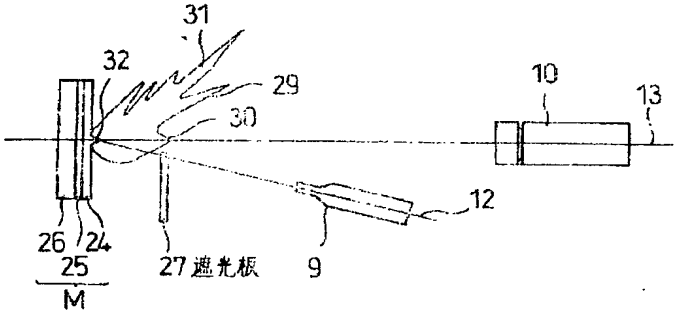


Fig 12

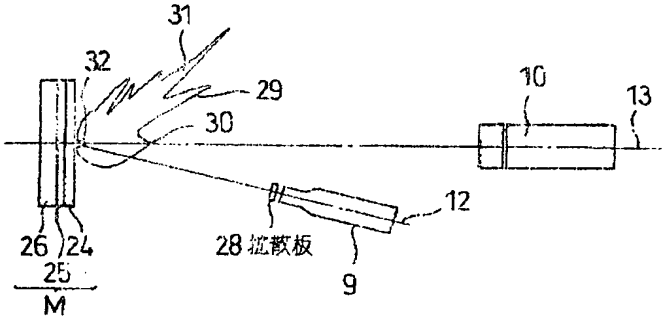


Fig 13